

**MULTIPLE-COMPONENT TAMпон APPLICATOR****5 BACKGROUND OF THE INVENTION****1. Field of the Invention**

The present invention relates to an insertion device, such as a catamenial tampon applicator. More particularly, the present invention relates to a multiple-component tampon applicator formed from at least three distinct and separate components.

**2. Description of the Prior Art**

The majority of commercial tampon applicators are of approximately uniform cross-section and are formed from only two components, namely a barrel and a plunger. The fingergrip, if any, is formed as an integral part of the barrel component. Some applicators have a fingergrip and a plunger of a cross-sectional area reduced from that of the applicator barrel. This feature has been found not only to render the tampon applicator more grippable, but it is also more aesthetically preferred.

For current reduced cross-sectional area fingergrip tampon applicators, the tampon plegget must be loaded into the insertion end of the applicator due to the smaller opening at the fingergrip end. Thus, these tampons are restricted to top or insertion end loading. This requires the petals of the applicator, if any, to be post-formed to their final shape after the plegget has been loaded. Post-forming of petals requires the material to be plasticized. Typically, plastic petals are plasticized by heat and are easily shaped by the use of an external forming die.

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On the other hand, cardboard petals are more difficult to plasticize and require the additional use of an internal mandrel. Usual methods involve heating the tip to volatize the water (either existing or supplemental moisture), and then forcing the petal into shape using an internal mandrel in conjunction with the external die. The internal mandrel has a cross-sectional area that is approximately the same as the barrel's interior, and consequently would not be able to enter through a reduced cross-sectional fingergrip area. Therefore, the necessity of the internal mandrel to shape the petal tip has thus far precluded the manufacture of a reduced cross-sectional fingergrip area on a cardboard applicator.

Therefore, there is a need for a tampon applicator, and more specifically a cardboard applicator, that can be manufactured such that petal tips can be pre-formed or integrated on the insertion end of the applicator barrel, prior 5 to loading an absorbent plegget, using existing manufacturing processes and equipment.

#### **SUMMARY OF THE INVENTION**

It is an object of the present invention to provide a tampon applicator that is assembled from at least three distinct and separate components.

It is another object of the present invention to provide such a tampon applicator that has a barrel formed from cardboard.

It is still another object of the present invention to provide such a tampon applicator having a fingergrip with a 20 reduced cross-sectional area compared to that of the applicator barrel.

It is a further object of the present invention to provide such a tampon applicator having petals at the insertion end of

the cardboard barrel prior to loading the barrel with an absorbent pledget.

It is still a further object of the present invention to  
5 provide such a tampon applicator in which the petals are pre-formed using existing processes and equipment.

It is yet a further object of the present invention to  
provide such a tampon applicator in which the petals are formed  
on a separate and distinct insertion tip component that may be  
connected to a separate barrel component either before or after  
a pledget is loaded into the barrel component.

It is still yet a further object of the present invention  
15 to provide such a tampon applicator that prior to assembly of  
the applicator, and prior to loading the barrel component with  
an absorbent pledget, petals may be formed on the insertion end  
of the barrel using existing processes and equipment.

20 These and other objects of the present invention will be  
appreciated from a multiple-component tampon applicator formed  
from at least three separate and distinct components. A  
separate insertion tip component having petals may be formed.  
This separate component may then be connected to the barrel

component either before or after an absorbent pledget is loaded into the barrel component. Also, a fingergrip may be formed as a separate component or it may be integrally formed with the barrel.

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The multiple components may be formed from materials including, for example, plastic, cardboard, paper slurry, pulp slurry, pulp molded paper, heat shrink plastic, plastic tubing, biopolymers including carbohydrates and proteins, or any combinations thereof.

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an exploded view of a multiple-component applicator having three components that form the tampon applicator of the present invention;

Fig. 2 is an exploded view of a multiple-component applicator having four components that form the tampon applicator of the present invention;

Fig. 3 is an exploded view of a three-component applicator of the present invention where the barrel component includes the fingergrip;

Fig. 4 is a perspective view of an assembled three-piece tampon applicator of Fig. 1;

5 Fig. 5 is a perspective view of a fingergrip component of  
the tampon applicator of Fig. 1;

Fig. 6 is a perspective view of a fingergrip component according to another embodiment of the present invention;

10 Fig. 7 is a perspective view of a three-piece applicator according to yet another embodiment of the present invention;

15 Fig. 8 is a perspective view of several embodiments of fingergrip components having various gripping structures according to the present invention;

Fig. 9 is a perspective view of a fingergrip component according to another embodiment of the present invention;

20 Fig. 10 is a perspective view of a fingergrip component according to another embodiment of the present invention;

Fig. 11 is a perspective view of a fingergrip component according to another embodiment of the present invention;

Fig. 12 is a perspective view of a multiple-component applicator having three components that form one embodiment of a tampon applicator of the present invention;

5 Fig. 13 is a perspective view of the fingergrip and barrel components of Fig. 12 in a heated former; and

10 Fig. 14 is a perspective view of a multiple-component applicator with the barrel and fingergrip formed in the heated former of Fig. 13.

#### **DETAILED DESCRIPTION OF THE INVENTION**

15 Referring to the drawings and in particular Fig. 1, a first embodiment of a multiple-component tampon applicator of the present invention is represented generally by reference numeral 10. One distinguishing feature of this applicator 10 is that instead of being formed from two components, namely, a barrel and a plunger, it is formed from three distinct components. In 20 a preferred aspect of this first embodiment, the three distinct components are barrel 12, plunger 14, and fingergrip or fingergrip component 16.

The barrel 12 retains its approximately uniform cross-section, thus allowing petals 18 to be formed prior to pledget insertion. The petals 18 can be formed with the assistance of an internal mandrel, if desired.

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Referring to Fig. 2, a second embodiment of the multiple-component tampon applicator according to the present invention is depicted. This applicator 10 is formed from four distinct components. Again, as a preferred aspect of this second embodiment, the preferred components are barrel 12, plunger 14, fingergrip 16, and insertion tip 19. Petals 18 are formed on insertion tip 19. As such, an absorbent pledget may be loaded into barrel 12 either before or after insertion tip 19 is connected to barrel 12.

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Referring to Fig. 3, a third embodiment of the multiple-component applicator of the present invention is shown. This applicator 10 is formed from at least three distinct components, namely, barrel 12, plunger 14, and insertion tip 19. Barrel 12 has a forward end 21. In this embodiment, fingergrip 16 is integrally formed as part of barrel 12. An absorbent pledget may be loaded into barrel 12 through forward end 21, prior to connecting insertion tip 19 to the barrel.

Barrel 12 of the multiple-component applicator 10 of the present invention may be formed from any suitable material. Suitable materials for forming barrel 12 include, for example, biopolymer, cardboard, heat shrink plastic, paper slurry, 5 plastic, plastic tubing, pulp slurry, pulp-molded paper, or any combinations thereof. Preferably, barrel 12 is formed from cardboard. Barrel 12 may be formed from spiral wound or convolutely wound cardboard.

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Any individual component that forms the multiple-component applicator, and especially barrel 12, may be internally and/or externally coated with any suitable material to enhance its strength and/or reduce surface friction. Suitable coatings include, for example, cellophane, cellulose, epoxy, lacquer, nitrocellulose, nylon, plastic, polyester, polylactide, polyolefin, polyvinyl alcohol, polyvinyl chloride, silicone, wax, or any combinations thereof. It should also be understood that barrel 12, while depicted as a single component, may be formed from one or more components, such that when assembled, the one or more components form barrel 12.

Plunger 14 may be formed from any suitable material.

Suitable materials for forming plunger 14 include, for example, biopolymer, cardboard, heat shrink plastic, paper slurry,

plastic, plastic tubing, pulp slurry, pulp-molded paper, or any combinations thereof. Preferably, plunger 14 is formed from cardboard.

Referring to Figs. 1 and 2, fingergrip 16, as a separate component, provides a way to create an applicator having a cardboard barrel with pre-formed petals and, perhaps, a reduced cross-sectional fingergrip area with an accompanying reduced cross-section plunger 14. Fingergrip 16 has two distinct ends, barrel or forward end 20 having a diameter approximately equal to that of barrel 12, and plunger or rearward end 22 having a diameter slightly larger than that of plunger 14. Fingergrip 16 also has channel 26, which extends axially through the entire length of the fingergrip. Channel 26 has a cross-sectional area slightly larger than that of plunger 14 so as to accommodate the plunger during assembly of applicator 10. The pledget (not shown) is loaded into barrel 12 through fingergrip or rearward end 24 of the barrel. Petals 18, if any, on barrel 12 have been pre-formed into their final shape, as in Fig. 1.

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As shown in Fig. 2, when insertion tip 19 and fingergrip 16 are formed as separate components, an absorbent pledget (not shown) may be loaded either through forward end 21 or barrel rearward end 24 of barrel 12.

Referring to Fig. 3, when insertion tip 19 is formed as a distinct component, it also allows barrel 12 and fingergrip 16 to be formed as one component. With this configuration, an absorbent plegget may be loaded into barrel 12 through forward end 21, prior to assembling the multiple-component applicator.

By way of example, Fig. 4 shows the three-component applicator of Fig. 1 assembled. Once an absorbent plegget (not shown) is loaded into barrel 12, barrel forward end 20 of fingergrip 16 is connected to barrel 12 at barrel rearward end 24. Plunger 14 is then inserted into fingergrip plunger end 22 through channel 26. Alternately, plunger 14 may be loaded into channel 26 of fingergrip 16 prior to the fingergrip being connected to barrel 12. Fingergrip 16 may be secured permanently to barrel 12 by any conventional method.

Preferably, fingergrip 16 is connected to barrel 12 with an adhesive. Outer edge 25 of fingergrip 16 may be of such a size that it creates a continuous surface flush with the outer edge of barrel 12.

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It should be understood that the multiple-component tampon applicators depicted in Figs. 2 and 3 may also be assembled according to the same basic tenets set forth for assembling the three-component applicator of Fig. 1. One distinguishing

feature of the applicator of Fig. 2 with respect to assembly, is  
that the absorbent plegget may be loaded into barrel 12 either  
through forward end 21 or barrel rearward end 24. Therefore,  
the order in which the components are assembled may depend on  
5 which end of barrel 12 the plegget is loaded. A distinguishing  
feature of the applicator of Fig. 3, with respect to assembly,  
is that barrel 12 and fingergrip 16 are formed as one component,  
therefore, the absorbent plegget must be loaded into barrel 12  
through forward end 21, prior to assembling insertion tip 19  
with barrel 12.

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It should also be understood that each component of the  
tampon applicator set forth above may be formed from one or more  
individual parts or sections (i.e. barrel 12, plunger 14,  
fingergrip 16 and/or insertion tip 19 may be formed from one or  
more individual parts or sections that are connected to form the  
component). In addition, it should be understood that while  
each applicator component is shown above as being discrete and  
separate from each other, any two or more of the components may  
20 be integrally formed and then assembled with the one or more  
separate components. By way of example, the insertion tip 19,  
the barrel 12, the fingergrip 16, and/or the plunger 14 may be  
integrally formed, in any combination. In addition, any  
component that is made up from two or more parts or sections, as

set forth above, may be connected to form that component, prior to connecting with any other individual component to form an assembled applicator 10. However, the overall applicator will, nonetheless, have at least three components.

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Fingergrip 16 can be formed from any suitable moldable material. Suitable moldable materials include, for example, biopolymer, cardboard, heat shrink plastic, paper slurry, plastic, plastic tubing, pulp slurry, pulp-molded paper, or any combinations thereof. In a preferred embodiment of the present invention, fingergrip 16 is formed from pulp molded paper.

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Fig. 5 is another embodiment of the present invention. Fingergrip 16 is formed with a connector ring 32 on barrel forward end 20. Connector ring 32 has a diameter slightly larger than the internal diameter of barrel 12 so that fingergrip 16 can be connected and secured to barrel 12 by interference fit.

20 Fig. 6 is another embodiment of the present invention.  
Connector ring 32 may be formed with one or more tabs, ridge  
and/or slots 34. One or more tabs, ridges and/or slots 34  
interlock with corresponding tabs, ridges and/or slots (not  
shown) formed on the inner surface of barrel 12, thus secur-

fingergrip 16 to barrel 12. The one or more tabs, ridges and/or slots may be formed on external and/or internal surfaces.

Fig. 7 is another embodiment of the present invention. In  
5 this embodiment, fingergrip 16 is formed from a heat-shrinkable material 36 that has an initial diameter larger than the outer diameter of barrel 12, and shrinks to a diameter at least as small as plunger 14. Heat-shrinkable material 36 at barrel end 20 is shrunk to fit the outside of barrel 12 snugly. The union between heat-shrinkable material 36 and barrel 12 can be reinforced with an adhesive. Plunger or rearward end 22 of fingergrip 16 is shrunk so that it is just larger than the outside diameter of plunger 14.

10 15 The fingergrip 16 may be formed with any number and/or configuration of gripping structures, to further enhance the applicator's grippability. Fingergrip 16 may be smooth or, more preferably, may include one or more patterned or textured structures extending above and/or below the surface of the  
20 fingergrip.

The gripping structures may include, for example, one or more abrasive materials, embossments, grooves, high wet coefficient of friction materials, lances, pressure sensitive

adhesives, protuberances, slits, treads, or any combinations thereof. In addition, the gripping structures may be formed in any shape, including, for example, arc, circle, concave, cone, convex, diamond, line, oval, polygon, rectangle, rib, square, 5 triangle, or any combinations thereof.

Referring to Fig. 8, by way of example, several different fingergrip embodiments having various gripping structures are depicted. Fig. 8A depicts fingergrip 16 with one or more bands 38 circumferentially disposed around fingergrip rearward end 22. Fig. 8B depicts fingergrip 16 with one or more dot-like structures 40 disposed circumferentially around fingergrip rearward end 22. Fig. 8C depicts fingergrip 16 with one or more circular structures 42 disposed circumferentially around fingergrip rearward end 22. Fig. 8D depicts fingergrip 16 with two or more wavy bands 44 disposed circumferentially around fingergrip rearward end 22.

It should be understood that the gripping structures may be 20 arranged circumferentially around fingergrip 16 in any pattern suitable for forming a gripping area. For example, the gripping structures can form a distinct pattern, such as, rows, columns or may be formed intermittently with breaks in structure or in any random order or pattern.

Fig. 9 is another embodiment of the present invention. In this embodiment, fingergrip rearward end 22 may be formed with a circumferentially flared or ridge-like structure end 46, to further enhance the gripping characteristics of the applicator.

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Fig. 10 is another embodiment of the present invention. In this embodiment, fingergrip rearward end 22 is formed with a stepped taper to further enhance the gripping characteristics of the applicator.

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It is also understood that the cross-section of barrel 12,  
plunger 14, fingergrip 16 and insertion tip 19 can be circular,  
oval, polygonal or elliptical. Also, insertion tip 19 can be  
tapered, elliptical, dome-shaped or flat. Barrel 12 can be  
5 straight, tapered, or curvilinear along its length.

TONGUE AND GROOVE  
APPLICATOR

Referring to Figs. 12 through 14, a method of assembling a  
multiple component tampon according to another embodiment of the  
present invention is depicted. Applicator 10 has independent or  
discrete barrel 12, plunger 14 and fingergrip 16. To assemble  
the components, adhesive 50 is applied to the fingergrip barrel  
end 20. As depicted in Fig. 13, fingergrip 16 is inserted into  
cavity 62 of heated shaper 64. Mandrel 60 is inserted into  
fingergrip 16 housed in cavity 62. Barrel 12 is inserted over  
mandrel 60. The barrel 12 and fingergrip 16 are allowed to  
remain in position in heated shaper 64 for about 1 to 20 seconds  
and more preferably 5 to 10 seconds.

Referring to Fig. 14, when removed from the mandrel 60 and  
20 heated shaper 64, the fingergrip 16 is connected to barrel 12 at  
tapered rearward end 66. Plunger 14 may then be inserted into  
fingergrip 16.

The foregoing specification and drawings are merely illustrative of the present invention and are not intended to limit the invention to the disclosed embodiments. Variations and changes, which are obvious to one skilled in the art are intended to be within the scope and nature of the present invention, which is defined in the appended claims.